

Navicular Syndrome Notes

Part One by Franco Belmonte

Notes from lessons for professional trimmers, written in memory of James Rooney, Pathologist

These notes on **Navicular Syndrome** come from lessons and training meetings for trimmers and owners organized by bitlessandbarefoot-studio in Italy. The words are simple; no word coming from greek or roman language. Be present, write, call, research. In short, knock, and you will find a door opened to you, so answer.

If navicular syndrome happens to your horse, do not be scared. To manage a navicular horse is neither dramatic nor expensive, at least economically.

When the barefoot option is chosen, the long term results are encouraging. It is not necessary to kill the animals, because it is not true that they cannot heal. A pain-free decent life and various levels of performance are guaranteed.

After reading, for a better comprehension of the subject, I suggest you to get the “*Under the Horse*” DVD set by Pete Ramey. The whole DVD series is dedicated to navicular syndrome and laminitis. (Disk #4 specifically to navicular syndrome.)

Then, for a very cheap price (even less than \$2.00, if lucky), you can still find through Amazon.com a book written by Dr. James Rooney, *The Lamé Horse*. This is a 40 year old book that everyone should study with care and attention.

First, here is a message for you, thanks to Tomas Teskey, VMD:

Dear lovers of horses,

If you or one of your family were injured, would you seek out the best possible care? Why? I ask you this because it really is a CHOICE that you make. While we are surrounded today by a society that often wants the quickest, least expensive remedy, it is understandable that many of us think our “choices” are limited. My intent in educating horse owners about the real options they have is simple: I find great value in helping others bring themselves and their horses to honest health and happiness. To do this, I refuse to “cover up” the problem. Rather, I choose to educate and empower you with the truth, so that you really have the “bigger picture” in mind. What you choose is your own personal journey, and if it becomes your choice to work with the nature of yourself and the horses, I would love to help you.

Introduction

Let’s begin with some definitions. Boring maybe, and just sketched, but useful to define the subject. Navicular Syndrome (and I’ll try to give a new definition at the end) is one of the most common “reasons” for pain and lameness in horses, mostly in the front hooves.

It is called “Syndrome” or “Disease,” depending on the possibility

or not of the assignment of responsibility of the pain. Only when, among the other parts, the bones are affected, and by x-rays we can find alterations considered permanent, we can talk of disease.

Here is a good definition of syndrome: “an association of symptoms and clinical signs representing the clinical manifestations of one or various diseases not related to their etiology.” Since I immediately contradicted myself, let me split the word. “Syn” comes from greek and means association. Precisely, an association of clinical signs that contributes to make a framework, not well readable according to some, but clear for us thanks to Rooney and the researchers that followed him.

While the syndrome is always connected to sensitivity or pain, permanent alterations (disease) that the bones suffer and can follow or go with, can be silent if the rest of the frame (the soft surrounding tissues) can return to operative (functional), and the total is stabilized and fit.

The delay that occurs with different tissues over time, and their different ability and speed to recover (tendons, blood vessels, bones, etc.) is the reason why animals with radiographic evidence can still be “sound,” and, in opposition, why animals radiologically healthy can be aching and lame. Why? Something happens around the navicular bone, but only later affects it. Subsequently, the animal can recover, and only the bone results appear damaged.

Why does that happen? Why does the rear part of the hoof become painful? As time and years go by, during the last two centuries, the responsibility was imputed to three different causes:

Vascular. Degenerative. Mechanical.

1) Vascular: a reduced supply of nutrients and oxygen into the area, and consequent suffering. If tissues do not eat and breath, they cannot grow, maintain themselves, nor keep fit and work.

2) Degenerative: for a not well-defined reason, maybe passed down genetically, a deterioration begins.

3) Mechanical: friction, heat, and vibrations wear out the tissues, submitting them to forces of an intensity and direction for which they have not been designed.

I will refer to the 5th edition of *Adams’ Lameness in Horses*, adding comments and giving reference to the page. For a better comprehension of the whole matter, read the books *Adams’ Lameness in Horses* and Rooney’s *The Lamé Horse* (the latter from which I provide a famous excerpt in part 2 of this article).

Let me deal with ethics in the next few lines. *The Lamé Horse* is a book of medicine. Even if Rooney knows the lack of resources of many veterinarians and/or owners, and despite that, its aim is constantly the recovery, the healing. For every problem and lameness of the horse, he tries to give a reason and assign a responsibility. Responsibility falls on everyone who has a duty to take care of the horse—such as allowing it to move improperly,

Shoeing is an integral part of the system, keeps and feeds income positions even if the modern use of the horse and the new technologies of materials make it anachronistic.

due to lack of skills or rushed training.

On the contrary, *Adams' Lameness in Horses* is a book of technique where the animal can just keep on doing its work and duty. I do not see any "feeling." A feeling could make the whole system collapse. The owner of an animal always expects to get profit, not to increase an expensive balance or, even worse, lose time.

The professionals are educated, trained for that in the university. They know how to try to fix the "part" immediately, but often just temporarily apply a technique that most of the time desensitizes instead of heals. For a better comprehension of this behavior, I invite you to read Dr. Strasser's book, *Shoeing, A Necessary Evil?*

My hope is that one day the university could train both doctors that heal and are technicians, with no compromises. At least we'll know the principles, choices, and training of who we decide to entrust with our animals.

But, going back to the reasons for navicular, testing on the vascular system (vascular theory) taken in a laboratory didn't provide reliable data. Animals on which vascular damages were caused experimentally didn't show the expected results. On the other hand, directly degenerative (degenerative theory) is not arguable (see *Adams' Lameness in Horses*, pages 664 and following).

All the causes are taken back to the same matrix: hooves small and contracted, overweight horses, improper work. In the *Adams'*, no one points to the shoeing as the main reason for the reduction of the flow of nutritive elements and oxygen. On the contrary, we can think and say that defects, or a wrong trim, or an all-year round shoeing, or imbalance are the cause of action of forces that the structure cannot bear continuously.

It seems so clear to us, but it is not allowed. Shoeing is an integral part of the system, keeps and feeds income positions, even if the modern use of the horse and the new technologies of materials make it anachronistic. For all the damages caused by shoeing, please read the books of Dr. Strasser: *Shoeing, A Necessary Evil?* and *Navicular No More*.

In the barefoot movement, on the contrary, naturalists and university researchers stress:

- 1) The necessary health of the whole foot, with a special regard to the frog and the development and strength of the rear part of the foot (Dr. Bowker) and/or the height of the heels and bars (Dr. H.Strasser).
- 2) The development and maturation of the structures obtained, thanks to movement, large areas, social relationship, proper food, and a technical trim.

Shortly, the different causes invoked by the traditional podology, above all the hereditary and degenerative one, are thought indirect and secondary to the deficiency of management that must change with the adoption of a mechanics that brings the foot back to the correct physiology.

Shoeing should be considered, at the same level as an incorrect trim, as the first reason for the disease. One can understand that to take responsibility for the management of the horse is uneasy and embarrassing. It is easier to impute the damages to an accident, and much more profitable for the professionals to suggest solutions that provide for long term interventions. If everything goes wrong, the diagnosis was right, and the disease aggressively progresses—the horse is forever changed. Taking the life of a suffering animal is a mercy, isn't it? So even traders can have a profit.

It is barefooters' opinion that inflammation, overall wear, and pain are caused by the negative mechanics imposed by shoeing or endured by a barefoot hoof out of balance or neglected. The animal itself manages its pain with

postures, movements, and a way to support the weight that makes the clinical picture worse with time.

Most of the time the common veterinarian renounces any possibility of healing in favor of the prompt use of the animal. With corrective or orthopedic shoeing, there is even more reduction in the elastic deformations of the loaded hoof, so the anesthetizing effect makes the use of the horse possible. The mechanism of the hoof, restricted with a simple conventional shoeing, is much more inhibited with the corrective one; blood flow is reduced, nervous terminations asleep. What the horse feels, it is hard to imagine. Maybe the same condition we experience after a long period of immobility.

Identification of Navicular Syndrome

The animal stumbles, and while trying to shift the weight from his heels, he places the toes of his hooves on the ground first. This can be seen at different gaits, or at rest.

If, unfortunately, your horse develops heel pain, you can expect certain maneuvers, actions, and observations if you call upon a professional who does not belong to the barefoot movement. First, the point of the hoof is placed on a wooden wedge, for a limited time—*Adams'* suggests to be 60 seconds. The resulting compression of the rear part of the hoof—the stress on flexors—exasperates the pain and lameness. The horse, after this, gets worse. Another technique is the examination with hoof testers on the central and front part of the frog, which causes pain if the underlying parts are compromised.



Photo courtesy Dr. Kellon: damaged navicular bone. Horses with radiographic evidence could show soundness, and, in opposition, horses radiologically healthy can be aching and lame. By the time a navicular bone reaches this point, how much damage has occurred to the soft tissues and how much could the horse repair?

Photo courtesy Franco Belmonte

Regarding that in *Adams*’, it is written that too thick frogs or too thick soles can hide symptoms. I have observed that thick or healthy frogs normally belong to feet that are not contracted, and thus difficult to associate with pain in the rear part of the hoof—and subsequently, to the syndrome. It is possible to say the same about thick and healthy soles. We have to make a distinction between a real thick, healthy sole and a sole covered by layers and layers of exfoliating, easily crumbled or hard material (which is a consequence of a bad mechanics, restriction of movement, or absence of ground contact).

A “too thick” sole? This is typical of a horse with a well-shaped and performing hoof, hardly a lame one!

On the contrary, for example, layered material at the toe implies a palmar or plantar negative angle; consequently, constriction of the navicular which is squeezed between the second and third phalanx, and the flexor tendon. We’ll find the same prolonged continuous condition when we put a wedge under the toes of the hooves.

The corneous material under the sole can pile up for different reasons. Lack of movement, injury, improper trim, and/or imbalance. Unfortunately, the poor understanding and the lack of reference does not allow most professionals to recognize the problem. Also, shod hooves are so commonly deformed that their shape becomes ordinary.

Regarding the use of the hoof tester, let me quote Jaime Jackson, *The Natural Trim*, page 197:

Some vets and farriers will deploy the notorious hoof tester, a mechanical device that grips and squeezes the hoof to pinpoint pain within the hoof capsule. This procedure is unnecessary and could cause damage... beware!

Jaime goes on: “Let’s get these medieval torture devices banned, Harmful, unnecessary, barbaric.”

About this same device, I recently had a talk with Stefano Parduzzi MD, orthopedic surgeon in the hospital of Bozen in Italy. His words: “The hoof and the whole equine foot is made of high density material. More the material is dense, the easier it is to transfer pressure. Pain can be elicited from a distance. The diagnostic specificity is necessarily poor.”

I feel the same way, I do not see a real utility in the use of the hoof tester. The last time I had one in my hands was last summer in Sicily. I was with my friend Valerio Contarini, a clever barefoot advocate and a veterinary medical doctor. He put the tester in my hands, asking for my opinion. I am sure he noticed my shyness. It is a fact that the horse was clearly in pain, due to receiving heavy grains and poor hygiene, and training done too early. He did not need diagnostic tools, but a radical boarding change.

Another diagnostic procedure for Navicular Syndrome is the anesthesia of the digital palmar nerve. Why is it called digital and palmar? Digital because the nerve is situated in the finger; palmar because the “front” hoof corresponds to our hand. The palm is referred to our hand, the palmar aspect belongs to our foot.

However, this procedure, anesthesia of the digital palmar nerve, is not declared specific for the identification of the problem (specificity was 0% in *Adams*’, page 668)! In a research study that involved 164

horses, the same result of eliciting pain was obtained in animals whose lameness could be attributed to different reasons, such as: fracture of the pedal bone, trauma or degeneration of the joint between the third and second phalanx, inflammation of the surrounding tissues, osteoarthritis, lameness, fracture of the processes, damages to the cartilages, or various fractures. (The specificity of the technique is equal to zero per cent! *Adams*’, page 668).

Different sites of inoculation of anesthetic have not shown any better diagnostic value. And so on. The conclusion is that this procedure cannot distinguish between “navicular pain, coffin joint pain, sole pain or other causes of heel pain” (literal translation from *Adams*’).

Note that *Adams’ Lameness in Horses* is the text-book that educates veterinarians and technicians around the world. This book is not partisan of the barefoot movement. Only a few pages are dedicated to the bare hoof—a couple of pages over a total of 1,174!

At the radiographic examination, it is possible to evaluate alterations, calcifications, and altered spatial relationships between parts. Unfortunately, x-rays can only point out degenerations that already exist.

In a study on 49 horses (*Adams*’, page 671), with only radiography as a diagnostic tool, it would not have been possible to point out severe pathological cases, since one cannot examine the soft tissues that are “the first ones subject to the stress of an unfavorable mechanics and for a long time.” (Rooney, *The Lam Horse*).

Formerly, Dr. Rooney in his book *The Lam Horse*, published in 1974, identified the toe-first landing as the cause of the abnormal stress, inflammation, and deterioration of the deep flexor tendon—and the pain in the rear part of the foot. Later, inflammation and degeneration spread to the structures, with which the tendon is in touch or indirectly related.

Moreover and regarding the toe landing, we find the only data I think really statistically significant that *Adams*’ quoted: *that 99% (ninety-nine percent!) of the horses to which navicular syndrome was attributed landed on their toes.*

Dr. Rooney was able to reproduce in laboratory on the stump of healthy horse legs the same injuries that he noticed in lame animals that arrived in the laboratory, euthanized, together with a file quoting diagnosis of syndrome. Fixing the cadaver hoof stumps on a machine and making them impact with the toes, he could reproduce some of the alterations in tendons and bones that can be observed in horses that had the syndrome diagnosed.

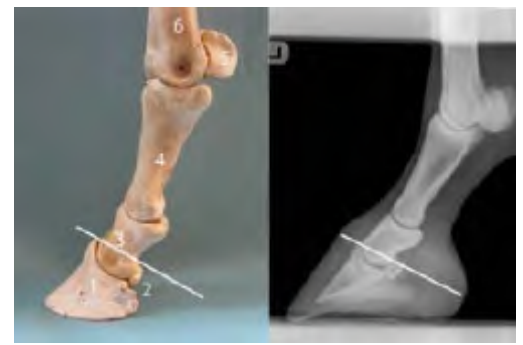


Photo courtesy Paige Poss. At the radiographic examination, it is possible to evaluate alterations, calcifications, and altered spatial relationships between parts. Unfortunately, x-rays can only point out degenerations already existing.

Photo courtesy Franco Belmonte

Dr. Rooney in his book *The Lamé Horse*, published in 1974, identified the toe-first landing as the cause of the abnormal stress, inflammation, and deterioration of the deep flexor tendon—and the pain in the rear part of the foot.

Thanks to his work as a pathologist, Dr. Rooney observed:

- injuries of the flexor tendons and navicular bone;
- often injuries of the tendon and not the navicular,
- he was not able to damage a navicular bone before the tendon was damaged first.

“That should have made them abandon all the reasons that didn’t come out of a mechanical origin.”—Pete Ramey, *Under the Horse*, Disc 4.

Other techniques can be used with better diagnostic power, such as: scintigraphy, CT Scan or MRI. Especially the MRI, but the cost, the transfer to a clinic (can be difficult to locate one with an MRI machine), time of anesthesia, makes their use marginal.

“No diagnostic tool can improve the condition of the horse.”—Jaime Jackson.

Following techniques of “natural boarding,” these pathologies do not arise or recede, making the diagnostic attempts, and the research itself, useless. However, the diagnostic imaging can help to make a forecast on the long-term performance we can expect from the horse. But, careful, if the professional is not sensitive, you would be urged to adopt measures that have little to do with healing, and much more with the temporary stabilization.

Continuing on the tracks of the Adams’ ... horses with slightest

radiographic evidences have great hopes to get back to sport life... (of course). More advanced cases are dealt “traditionally,” according to the standard of corrective farriery, and later we’ll see what Ovnicsek dictates, realizing de facto the possibility to use the animal immediately, or in very short time. But no intervention is described as decisive or lasting. On the contrary, if the “disease” is real and is not a “syndrome” (perhaps due to a more simple frog infection, I add), short periods of soundness and/or no medium and long term check of the animals are reported.

What happens of those animals?

To be continued in Part 2, next issue... 🍷

For comments and additional information, I can be freely contacted at email: **dr.francobelmonte@gmail.com**
www.bitlessandbarefoot-studio.org

***About the author:** Franco Belmonte is a biologist who lives in Italy. He created the Bitlessandbarefoot-studio Association, and takes care of its website (www.bitlessandbarefoot-studio.org—an educational site in both Italian and English). His barefoot horses pull carriages and work in the fields. His work consists of practicing, teaching, and spreading the barefoot method and techniques. He organizes seminars on barefoot and other topics, such as parasitology and systems of parasite control in horses.*

Navicular Syndrome Notes

Part Two by Franco Belmonte

Notes from lessons for professional trimmers, written in memory of James Rooney, Pathologist

Originally written in Italian, this part was difficult to translate. Thanks to Yvonne for her revision, and to the reader for his patience.

Navicular: Barefoot Course of Action

Those who belong to the barefoot movement and especially to the “iron-free” philosophy are generally not focused on performance or income. Their purpose is rehabilitation (and the attainment of the best possible performance) without regard to the time required—a true medical principle.

The practice of shoeing is rejected. Shoeing, a necessary evil? We deny the evil by declining the necessity. Shoeing is considered one of the greatest factors that lead to lack of development and/or subsequent degeneration of the back of the foot. Each application then a contradiction. When the standing horse deals with its sensitivity (pain) by shifting its weight away from the rear part of the hoof or walks toe-first, the tendons are strained by improper work and wear. With the deep flexor tendon, the entire area undergoes inflammation, erosion, gradual loss of function and remodeling. Lifting the heel from the ground, which removes support to the frog and rear part of the foot, gives relief but undoubtedly involves progressive atrophy, with consequent need to further increase the clearance from the ground and the slope of the hoof. The increased slope puts stress on the front part of the foot, damages the laminar connection and... this could be “the end of the horse.” (Dr. James Rooney, *The Lambe Horse*) The third phalanx, increasing the slope and pointing downwards, compresses and damages the dermis interposed between itself and the sole.

After planning the height of the heels and carefully balancing the hoof, exercising the horse on appropriate penetrable terrain interrupts the toe landing, and, with it, the damage. With movement, the proper support and strengthening of the rear part of the foot is promoted. The goal is to put a limited amount of pressure onto the rear part of the foot to encourage correct range of motion. Too much pressure means pain and immobility; insufficient pressure leaves the system to continue its way towards a greater degradation.

Only with the development of the structures, over time, will it become possible to further reduce the height of the heels. The increase in density and strength of hoof horn allows for the reduction of horn thickness. During rehabilitation, figuring out the best combination of terrain for exercise and protection with hoof boots and pads represents the daily problem for the trimmer to solve. They might insert pads of different thicknesses and densities inside the boots, in search of the most comfortable, but at the same time most

Photo courtesy Franco Belmonte



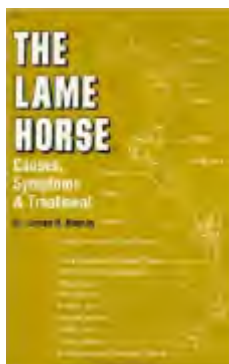
Barefoot draft horse clearly showing a heel-first landing.

challenging, device for the horse at that time.

A recent talk with Pete Ramey, (American Hoof Association): *“Yeah, I still go through the same routine I ‘always’ have: I experiment with no pads, thick pads, thin pads, etc. in a boot to try to find the best movement. If I find a combo that helps, I glue it on or use turnout boots with that setup, depending on the situation. I still can’t predict whether a horse will like increased or decreased frog pressure. I just have to experiment.”* (October 6, 2013)

Think this sounds like a paradox regarding heel height? Not so. Navicular horses, shod or not, often come from situations of abandonment or neglect—cheap or poorly shod for 12 months a year, or shod despite their poor condition to allow the continuation of the activity. If left barefoot, the heels are too low or too high. The common denominator is the ignorance of the right technique. Often it is sufficient to bring the capsule to the correct size, and the parts to the correct ratios. The protection of boots and pads does the rest without much trouble.

In the case that the horse’s terrain is not adequate, or is too aggressive,



During rehabilitation, figuring out the best combination of terrain for exercise and protection with hoof boots and pads represents the daily problem for the trimmer to solve.

sive, we might leave a heel higher than is believed correct under “normal” circumstances, perhaps by only a few mm’s. In the ideal situation, the trimmer or the owners should take note of the height of the heels at every visit. The variation of the height of the heels with respect to the solar plane at the angle of inflection informs us about the wear and the landing of the foot. A greater height of heels at the next visit indicates a reduced wear; a wall that is produced but not worn away. This reduced wear means an increased toe-first landing or (be careful) if wear is reduced along the entire perimeter of the hoof, insufficient movement. Insufficient movement might be caused by the restriction imposed by humans, or by exaggerated sensitivity (pain) that must be managed by change of the terrain, selecting a new pad, or a higher height of the heels.

In the case of a horse showing consistent heel height (wear that indicates flat landing or the heels landing first) and improved performance on any terrain, we can try to reduce the height of the heels, and therefore the slope of the third phalanx (coffin bone) to the range of normality (3°-8°) or even in a more limited range of 3° to 5°. The limit of the height of the heels is, as always, identified by the sole plane. The temporary increase of the height of the heels *if the terrain is penetrable* does not disturb the proper alignment of the digital axis. But at the moment of “impact,” in movement, the internal structures are less stressed with a slightly higher heel. It should be noted that these progressive reductions need caution. A reduction in heel height of 2-3 mm results in a reduction of the hoof wall of 1°. It requires time and patience. The possible overlap of other diseases that cause deformation of the hoof, first of all laminitis, should be taken into account. The synthesis of these principles is expressed in the AHA rehabilitation protocol Ramey-Taylor.

Not all of the barefoot movement agrees, and there are other various techniques. For example, there are some methods (different from what is discussed here) which put the emphasis on hoof shape, absolute proportions, and ideal footing, and will not accept a heel even temporarily slightly higher, nor recommend the use of hoof boots. Indeed, they believe any deviation from the ideal proportions creates damage.

Quote from Steve Hebrock, an instructor of Liberated Horsemanship: *“I hope you’re beginning to understand that the forces at work on the hoof are absolutely relentless, constantly at work reshaping it to permit the horse to land and break over with minimal resistance with every step. Just as I can’t change the basic forward motion of the car by changing the tire, the forces shaping the hoof aren’t altered by manipulations at the ground level, because motion doesn’t originate at the ground. So anything you do that resists a minimal-impact landing and a minimal-resistance breakover can only be negative; you can’t improve the motion of the horse beyond his conformation, but you certainly can cause long- and short-term damage to joints and soft tissues, depending on the nature, location, and extent of the ‘resistance’ you force upon the horse’s hooves. As I like to say, a hoof care provider has, in reality, only two choices: he or she can either help the horse achieve that minimal-resistance landing and break-over, which requires an acknowledgement of any shortcomings in the horse’s conformation, or he/she can stand in the way of long-*

and short-term comfort and soundness by deliberately or inadvertently departing from proper balance. I choose the former.”

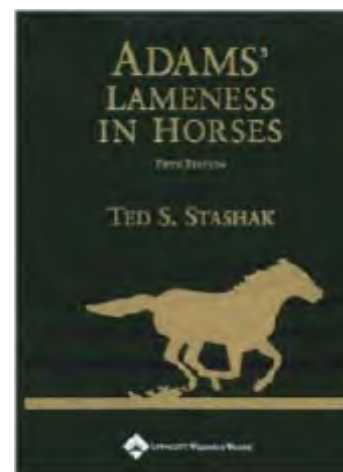
Leaving Hebrock and his integral forms (beautiful forms!), we encounter the model of Dr. Strasser. Here, Jaime Jackson’s mustang hoof has no place. The slope of the hoof is assigned, not an individual value. Consequently, the heels are trimmed to achieve and maintain the angles. The heels are particularly low, and the location where the horse exercises assumes the utmost importance. This is not surprising; bars protruding from the plane of the sole and heels that support a slope greater than 45° are seen as the cause of all problems. According to what Dr. Strasser wrote in her book “Navicular No More,” shoeing and the resultant poor blood perfusion, or a trim that neglects to reach the desired slope with undue pressure on the back are the causes of the disease. The destructive action of toe-first landing is not discussed even once in her book. The flexor tendon, workhorse of Rooney, is never mentioned.

Finally, the role of the frog must be emphasized. A poor, infected frog makes the horse sore. The pain causes contraction and toe-first landing, then atrophy of the internal structures. The digital cushion and the lateral cartilages remain out of operation and, in short, the structures of the whole back of the foot deteriorate. Unsanitary conditions, reduced movement and shoeing compete each other as causes. The recovery, maintenance and development of the function of the rear part of the foot are currently an object of research at Auburn University in Alabama.

A Comparison: The “Traditional” Protocol

I believe that “traditional” is not the right word to define current typical farriery actions. Past management in a case of lameness was the immediate deshoeing or... euthanasia. The deshod horse was left in the woods (as pasture was reserved for cattle) for a rest period, and occasionally trimmed.

Now, I will refer to *Adams’ Lameness in Horses*. I suggest you to read the book (pages 664-679), which is difficult to summarize. There is a lot of research without statistical significance (I cannot understand how the evaluation committee of the various scientific magazines accepts these for publication.) The “traditional protocol” (*Adams’*, page 672) provides: restriction of movement, limited walking, corrective shoeing, drugs designed to reduce inflammation. With restricted movement, the owner (or his attendant) has less time-consuming rehabilitation care. The drugs and/or shoes allow the owner to shorten the horse’s period of inactivity, and get him back to normal work faster. With “therapeutic shoeing,” further reduction—or total obstruction—of the natural elastic deformation of the hoof occurs. This means the damaged or immature tissues are not able to recover.



The restriction of movement is largely necessary because of the widespread use of powerful painkillers. It is not possible to ask an animal to be careful, so more damage is added with greater movement, when the horse does not feel any pain. The administration of anti-inflammatory drugs in the barefoot protocol is accepted when the animal is unable to move despite the protection of boots and pads. No rehabilitation is possible in total absence of movement.

Moderate exercise, a correct trim, clever moderation in the administration of anti-inflammatory drugs conjugated to freedom of movement and the temporary protection of the hoof with boots allow for the best possible compromise—functional to steady recovery. The degree of rehabilitation that can be achieved is closely related to the severity of the horse's original condition, but never should the horse be deprived of free movement, with hoof protection as needed.

The traditional suggestions for a gradual and controlled exercise (Adams', 672) are valid; their strictness becomes important when the animals are not kept by the good rules of "natural boarding." A stabled horse cannot exercise slowly 24/7, and is a victim of both prolonged inactivity and unhygienic bedding. Needless to say, these animals are not candidates for a true and lasting recovery. The inflammation is reduced by drugs. The horse is possibly technically shod by more experienced farriers, or shod more regularly, but the condition of the structures removed from their natural function will not improve, but rather will deteriorate (Pete Ramey, DVD number 4, "Under The Horse" series). Adams', page 672, 5th edition: "*In one study, improvements were observed within three months and 86% of the horses remained free from lameness for 1 year.*" In another: "*22 out of 32 horses showed signs of improvement within 6 weeks of initiation of corrective action farrier. There is not, however, any proof of long term soundness.*" Literally, sorry.

This is the premise. Here is a short description of the shoeing technique.

Aside from the basic principles of effective shoeing, ignored by the masses, the goal is the reduction and redirection of the forces insistent on the back of the foot. This sounds right, but the protection of the affected area (protect the injured region), as you may have realized by now, is wrong. How? Let's start with the described preparation of the hoof for shoeing:

- 1) Only the exfoliating material must be removed from the sole (and this should be a basic principle at each trim, always).
- 2) The frog is cleaned by removing the parts poorly attached to the mass and highlighting its margin at the apex. This is functional to the clear identification of the apex of the frog, and then to identify the point of breakover for the shoe placement.
- 3) Draw the transverse line (TL) to the median of the hoof at its point of greatest width. This point is usually placed 3/4 inch or 18 mm behind the apex of the frog, and on the same line where often the bars are embedded or sunk into the sole.
- 4) Reduce the height of the heels and the entire back wall to match the line that links together the angles of inflection with the widest part of the frog. Lowering the heels this way should lead to decontraction. (Columns are subject to more deformation if they are long). This is followed by the application of the shoe, and maybe pads and wedges. A similar process of trimming followed in a foot

to be left barefoot, without proper consistency, would probably lead to greater pain, because of the limited clearance between the ground and the internal structures, antalgic posture, exacerbation of the toe landing and chronicity of the problem. Maybe it is only partly possible to compensate with the use of temporary protection, such as a hoof boot. A huge number of barefoot horses are sore from too low heels, often created by misinterpretations of various techniques.

- 5) The entire front part of the wall, from the intersection with TL to the toe is then trimmed so that it protrudes 1/16 inch (1.5 mm.) above the true plane of the sole. A few millimeters powerfully affects the results. However, other parameters should be taken into consideration, such as the creation of an angle that will align, if possible, the digital axis. Great importance is placed upon the alignment of the dorsal wall to the pastern angle in Adams'. This procedure of trimming the wall as described can easily misalign this axis.

The artificial adjustment of the height of the heels by wedges applied as accessories to natural balance shoes is often requested of the farrier. This can also interfere with the alignment of the dorsal wall–pastern angle of the hoof, which is assumed to ensure the correct position of the bones that form the digital axis. Not only must the horse be positioned properly, but the human must be an intelligent observer. Above all, it is necessary that the wall and the third phalanx are parallel. A slight rotation between the wall and the bone, and the alignment might become apparent. If you want to reduce the slope of the coffin bone by 3°, it is difficult to detect very small misalignments. If our hoof is, for example, 12 cm long, we need to lower the height of the heels by 6 mm—simple trigonometry. Accomplishing this might involve removing too much of the rear platform of the hoof. In short, the alignment of the dorsal wall–pastern angle is only one element for the evaluation of the whole. Just a slight movement of the horse forward or backward is enough to change every angle.

- 6) The sole callus, continues Adams', should not be touched: "This modified sole is believed important for the support of the distal phalanx," (Ovnicek 1988). This "bridge" on the sole, described so well in "Under the Horse" and other publications of P. Ramey is distinctive and associated with pathology of the laminar tissue (for your reference: Disk 3, "Under the Horse" DVD series). Associated with a reduced thickness of the sole, not observed in healthy hooves, it corresponds to a particular tissue that remains embedded in the sole of the "healthy" hoof. Its ablation exposes the hoof to bruising, due to the weakening of a sole already too thin. Moreover, removing this immediately reduces the horse's movement, because sensitivity on uneven and stony ground will appear. Unfortunately, it is common to see the signs that the knife of either trimmer or farrier has eliminated this "bridge."
- 7) All the professionals agree about the importance of the point of breakover, in order to reduce as much as possible the tractive effort of the DDFT (deep digital flexor tendon). The point of breakover is the point or zone beyond which there should be nothing to hinder the movement. Where should it be located? Where nature intends, or even further back? The wise barefoot trimmer locates it where it should be without pushing on the throttle, maintaining a conservative stance. If possible immediately, otherwise gradually,

allowing the animal to accustom without additional trauma to the new favorable condition, about 1/4 inch in front of the edge of the sole. The breakover in the shod horse needs to be in front of the ground projection of the tip of the third phalanx. How much depends from the size of the animal. In the absence of a radiographic image, the apex of the frog and the ground projection of the tip of the third phalanx are considered too close in position. With x-rays, to determine the position of the distal edge of the coffin bone and to visualize it on the sole, a marker can be placed at the apex of the frog.

Photo courtesy Dr. Robert Bowker



This x-ray of a feral Mustang has the frog apex marked with a thumbtack, and shows the relationship between the tip of the coffin bone and the frog apex in this healthy foot.

Other drugs that reduce blood viscosity are used with reported variable and temporary results. “The use of supplements, glucosamine, chondroitin, magnesium ascorbate seems to have worked well in the space of two months.” If we look at the data with the aseptic help of statistical analysis, strong doubts arise over the entire setting.

See you in the next issue—for our last part of this article, including the surgical option, and Dr. James Rooney’s advice! 🐾

To be continued in Part 3, next issue... (Please see Part 1 in *The Horse’s Hoof Magazine* Issue 53.)

For comments and additional information, I can be freely contacted at email:

dr.francobelmonte@gmail.com
www.bitlessandbarefoot-studio.org

About the author: Franco Belmonte is a biologist who lives in Italy. He created the Bitlessandbarefoot-studio Association, and takes care of its website (www.bitlessandbarefoot-studio.org—an educational site in both Italian and English). His barefoot horses pull carriages and work in the fields. His work consists of practicing, teaching, and spreading the barefoot method and techniques. He organizes seminars on barefoot and other topics, such as parasitology and systems of parasite control in horses, nutrient requirements. Ultimately “Veterinary Hygiene” for the welfare of the animals.

Finally, the drug treatment, on page 676 of *Adams’*. Phenylbutazone *may be* necessary when the horse is lame or absolutely must continue his work. In some cases, phenylbutazone is used to control pain in competition horses. Not one word about this being morally wrong, or a disreputable use? The horse is, first of all, an animal. It must produce results, without allowing for genuine healing. Using this approach, the average period of “improvement in lameness” is reportedly in 3-12 weeks. Yes, this approach is not declared a cure, but a way to control the short-term pain.

This is unacceptable when the control of the pain can be immediately realized thanks to a technical barefoot rehabilitation protocol, the use of temporary protections and pads of appropriate thickness and density—all at a considerably lower cost.

Navicular Syndrome Notes

Part Three by Franco Belmonte

James Rooney and “The Lamé Horse”

In his book *The Lamé Horse* printed during the year 1974, Rooney recommended to let the horse go barefoot, denied the necessity of surgery, asked moderation in the administration of drugs, and pointed to the necessity to wait—because the “tincture of time” can lead the horse to rehabilitation as no other measure can.

The reader should consider that *The Lamé Horse* was conceived in the 1960's and published in 1974. The horse of Rooney is an animal useful to man, but that does not preclude a logical attitude and, most importantly from an ethical standpoint, does not accept the connivance of the veterinarian or technician for its exploitation and consequent early end.

ance of the veterinarian or technician for its exploitation and consequent early end.

This little book should not be missing in the library of the trimmer and those who intend to compete with the horse. For any lameness or trauma, Rooney indicates the cause in a particular gesture or movement proper of the rider's discipline.

“There has probably been more written and said about this little bone than anything else in the horse's body. First, its function: as mentioned with the

proximal sesamoid bones (and this is a distal sesamoid bone) the major function is to maintain a constant angle of insertion for the deep flexor tendon. (Fig. 99) shows what would happen if the navicular bone were not present. The angle of insertion on the coffin bone changes markedly as the bones move. Large changes in angle of insertion may be extremely destructive. It is such changes in angle with the snapping of the ligaments around the pastern joint that leads to tearing and nonarticular ringbone, for example.

Navicular disease is an arthrosis developing on the surfaces of the navicular bone and the deep flexor tendon (fig. 100). The cartilage and tendon are damaged first, followed by changes in the navicular bone itself. Osteophytes then appear. Many people have said and still do say that the first changes are within the bone. On the basis of my autopsy experience, this is simply and clearly not true. An interesting exception to this statement is the development of osteophytes on the medial and lateral ends of the navicular bone without damage to the navicular, deep flexor surfaces. This occurs, most obviously, in horses with contracted tendons or with a very upright pastern (the same difference). Without pursuing the details, these osteophytes appear because of snapping and jerking of the suspensory ligament of the navicular bone. This ligament runs from the end of the navicular to attach on the lower end of the long pastern bone, just above the pastern joint (fig. 101). With the upright pastern conformation there is a tendency for the pas-

tern joint to wobble back and forth, and this wobbling jerks the ligament which jerks on the end of the navicular bone, and new bone formation is the result (figs. 102,103). The same remedial measures that we shall recommend for navicular disease also apply in this case (see below). The arthrosis develops because of vibration and friction between the navicular and the tendon.

Vibration occurs for many reasons: too high heels, too low heels; very hard ground; foot too small for the size of the horse either genetically, as with many Quarter Horses, or because of too enthusiastic trimming; pain in the foot: the horse may put his foot on the ground improperly because he knows it is going to hurt. The pointing of a horse with navicular disease when standing may well have a dynamic counterpart. That is, he will tend to land toe first, instead of the proper heel first, because there is pain in the heel area. (Rear part of the foot not proper developed, infected frog). This leads to the same mechanical situation, snapping down of the heels to the ground, as with the low heel conformation. I think you can see how the story develops: a low heel may tend to navicular disease, navicular disease leads to pain, which leads to the horse putting his foot down as if he had even lower heels. Hard ground may lead to navicular disease even in a horse with a well built, well trimmed hoof. If the hoof is the slightest bit off to begin with, hard ground adds to the equation.

Show jumpers are particularly prone to this disease, as are hunters. It is rare indeed in flat runners or harness horses. As pointed out to me by Dr. Dan Marks, show jumpers describe a steeper parabola over their high jumps than do hunters or steeplechasers, on the average. The show jumper tend to land with his foot as shown in fig. 104, left, while the hunter lands as in fig. 104, right. The latter is proper. In the former the digit position is improper, and vibration will occur when the foot hits the ground. Also show jumpers may jump more in a given season, carry heavier riders, and may be heavier themselves than the long distance hunter: a multiple factor equation as with so many lamenesses of the horse.

I should note that navicular disease is rarely seen in the hind feet, though it does occur. A fascinating aspect of n.d. is that is not nearly as common as most people, including veterinarians, think. It is diagnosed frequently in flat runners, and in some places, at least, in harness horses. In fact, it rarely occurs in these animals. We have a condition in those animals which we can call navicularoid disease (like navicular disease). This is a soreness in the heel region that responds to hoof testers and blocks out when the nerve (heel nerve) to that area is blocked with anesthetic solution. Being honest, I have no exact idea what the lesion is; but it is clear that it is not damage to the navicular. This navicular-like disease is associated with the low, underrun heel and the long toe. For the time being, at least, I think it might be a tearing and bruising of the laminae that attach the heel and quarter of the hoof to the underlying tissues. When the heel is kept too short there is less tissue to adsorb the shock of landing, and vibration can occur, damaging the sensitive laminae. Also, the instability and neces-

sity to lift the body weight because of the hoof not cutting into the ground can add further complications.

...Trimming the Hoof.

Since I have said so much about this long toe, low heel situation, perhaps it would be worthwhile to digress and consider why so many horses are trimmed that way. First of all, and this is true, the wall is thinner at the quarters and heels. The hurried, careless blacksmith can rasp them away much more quickly than he can the thicker wall at the toe. Second, racehorse trainers feel that a horse can go faster, sprint faster, with this type of foot. That may be true. The horse can accelerate himself faster as the foot is leaving the ground. That is because with the longer toe there is a greater moment arm. That means the horse can exert more force against the ground by contracting his deep flexor muscle. The mass is the same. Therefore, since force equals mass multiplied by acceleration and we increase the force, we increase the acceleration. Ergo, the horse goes faster. Note, however, that the horse has to increase the force developed by the deep flexor muscle, which means it is working harder, which means it will tire, fatigue, earlier. When the muscle becomes fatigued, it can not position the hoof properly for impact with the ground. In fact, it will land heavily on the heel with the toe up. This is the same as the high heel (too high heel) conformation, which leads to vibration and damage either to the navicular or the laminae.

How do we prevent navicular disease? Let the horse wear his foot naturally barefoot, and then trim him the way he wears. The horse wears his foot the way he does because that is what is mechanically and biologically correct for him. Your eye and ideas are not nearly as good as nature's. How do you keep him going when he does have navicular disease? Shorten the toe and raise the heel, making it easier for him to break over, thereby reducing the force the deep flexor muscle has to exert and thereby easing the pain. Cutting the heel nerves is undoubtedly resorted to too often. It is not a cure but, rather, a last ditch, desperation measure. All too often, complete return to soundness does not result and, eventually, the damage to the deep flexor tendon will become so extensive that the tendon will rupture, and this is the end of the horse. In my opinion, and that of many veterinarians whose opinion I respect, heel nerving should never be done. If shoeing and proper trimming do not provide at least working soundness, the horse should be retired...."

A Redefinition of the Syndrome

Surely you have understood that talking about syndrome is improper. Syndrome means uncertain, indeterminate with the means of observation available. Nothing here is indeterminate, insecure, or of uncertain solution. The truth consists in the simple lack of development of the rear part of the foot or in an infection of the frog or in the shoeing practice that determines an incorrect movement, a limited blood perfusion, and all the consequences.

Shoeing, lack of care, impatient or incompetent demands, the arrogant pretensions of an owner or instructor are the causes of the disease. Disease is created by bad movement where the various parts of the hoof are required to work improperly. Do you have the intelligence to accept your responsibility?

It is sure that you and your horse can live your life and obtain satisfaction. In the worst case scenario, living a quiet life on softer ground or wearing hoof boots.

I would like to comment on the words where Rooney tells us to let the horse wear its hoof naturally to determine the shape. He did not mean, for sure, abandon the horse and neglect its hoof care. This is undoubtedly correct. But consider that what is needed is enough space and freedom of movement for the horse, which you may not be prepared for or able to afford.

The "natural boarding" and freedom of movement that you can offer to the horse should be accompanied by a technical trim. A technical trim that 40 years ago did not exist. A painful and deformed structure must be respected, and if possible, initially addressed. Consider Rooney's comments in light of the time he wrote them. Horses should not be abandoned while waiting for a miraculous "natural" recovery. Rehabilitation, in a man-made environment, must necessarily see the commitment of the owner assisted by the trimmer. The commitment increases as the actual conditions of management move away from that "ideal"—where, moreover, the disease is unknown.

You *can* help your horse. We can now say proudly: Who is afraid of Navicular Syndrome?! 🍷

Some Bibliography and References

"Under The Horse" DVD series, disc number 4, Pete Ramey

"Care and Rehabilitation of the Equine Foot", chapter 29, Pete Ramey

Website: <http://www.hoofrehab.com>

"Hoof Rehabilitation Protocol," Ramey, Ramey, Taylor
<http://www.hoofrehab.com/HoofRehabProtocol.html>

"Anatomy of the Equine," Jenny Edwards and Paige Poss
<http://www.anatomy-of-the-equine.com>

Articles and Lectures, Tomas Teskey

The Natural Trim, page 197, J.Jackson

Shoeing: A Necessary Evil, H.Strasser

Navicular No More, H.Strasser

Adam's, Lameness in Horses, Stashack

Please see Part 1 in *The Horse's Hoof Magazine* Issue 53 and Part 2 in Issue 54. For comments and additional information, I can be freely contacted at email: dr.francobelmonte@gmail.com and website www.bitlessandbarefoot-studio.org

About the author: Franco Belmonte is a biologist who lives in Italy. He created the Bitlessandbarefoot-studio Association, and takes care of its website (www.bitlessandbarefoot-studio.org - an educational site in both Italian and English). His barefoot horses pull carriages and work in the fields. His work consists of practicing, teaching, and spreading the barefoot method and iron free techniques. He organizes seminars on barefoot and other topics primarily related to biological sciences, such as nutrient requirements of horses, and parasitology and systems of parasite control in horses.